
Overview of *Sphaeralcea* (Malvaceae) in Southern Utah and Northern Arizona, U.S.A., and Description of a New Species

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ABSTRACT. Described is *Sphaeralcea gierischii* N. D. Atwood & S. L. Welsh, sp. nov., which is distinguished from *S. rusbyi* by the glabrous or glabrescent herbage, with few or no stellate hairs confined to the leaf margin, larger (15–25 mm long) flowers, and restricted range and habitat, and from *S. moorei* in the 3- to 5-parted, narrow leaf lobes, bright green leaves sometimes suffused with red-purple, and different habitat. Two varieties are evaluated at the species level within *Sphaeralcea* based on different morphological features, geographical distribution, and habitat: *S. moorei* (S. L. Welsh) N. D. Atwood & S. L. Welsh, stat. nov., and *S. fumariensis* (S. L. Welsh & N. D. Atwood) N. D. Atwood & S. L. Welsh, stat. nov. A key to the closely related taxa is included, and each of the taxa is provided with a description. The geographical distribution and ecology in southern Utah and northern Arizona, U.S.A., are also discussed.

Key words: Arizona, Malvaceae, North America, *Sphaeralcea*, Utah.

Collections taken over the past half century give indication that southern Utah is an important center for diversity and speciation in the genus *Sphaeralcea*. The genus as a whole consists of taxa whose morphological distinctions are obscured by overlap of practically every characteristic. Floral features tend to be very similar, and their usefulness as diagnostic characters is clouded by intermediates among the constituent taxa. Characteristics of the mature fruiting carpels have been considered as perhaps more important than other floral features. However, mature carpels are seldom collected. As soon as the main flush of flowering is finished most collectors tend to lose interest. Thus only a small fraction of the huge number of specimens collected in this attractive genus bear mature carpels. Some of the intermediacy of morphological features is the result of hybridization among the various taxa, often across sectional lines as defined by Kearney. Thus, numerous specimens intermediate between the taxa tend to accumulate in herbaria without proper identification. The result of the problematic morphology

has been the definition of taxa by use of multiple, overlapping characteristics. By such a procedure it has been possible to recognize the main subunits within what is more or less a mosaic of variation. The following short summary is confined to those species involved within sections *Laxae* and *Munroanae* as defined by Kearney (1935). This includes those species that are thought to have been most important in contributing to the diversity of forms present in southern Utah and adjacent Arizona.

The following key is presented to allow discrimination of most specimens of the related and similar taxa known to occur in southern Utah and immediately adjacent northern Arizona.

- 1a. Herbage only sparingly pubescent, the herbage bright green (the stems sometimes suffused with red-purple).
- 2a. Herbage glabrous or glabrescent, stellate pubescence, if any, confined to leaf margins (rarely a few stellate trichomes on the blade surface); calyces glabrous externally; flowers large, the petals 15–25 mm long; plants known only from northern Mohave Co., Arizona, and immediately adjacent Washington Co., Utah, on the Harrisburg Formation 3. *S. gierischii*
- 2b. Herbage definitely, though sometimes sparsely, stellate hairy overall (if sparsely so, of different distribution); calyces stellate externally; flowers large to small, petals mostly less than 20 mm long; plants of other distribution or habitat.
- 3a. Leaves 3- to 5-parted or -divided, the lobes with narrow, regularly pinnatifid margins, the teeth nearly right angles to the vein; carpels 4–6 mm high, often with transparent lacunae, reticulate mainly in the lower ca. 1/3; plants local in Washington Co., Utah, and south to southern Arizona 7. *S. rusbyi*
- 3b. Leaves variously lobed, divided, or parted, the lobes with broader margins irregularly toothed or lobed, but not as above; carpels 3–4.5 mm high, with opaque or translucent lacunae, reticulate in the lower 2/5–3/5; plants of various or broader distribution.
- 4a. Calyx pubescence almost or quite as dense as that of the herbage, mainly 4.5–7.5 mm long (if longer,

- not of Washington Co., Utah) at anthesis; leaf blades with lobes frequently not cut to the base, often wider than long, the terminal lobe mostly less than twice as long as broad; carpels with lacunae in the lower 2/5–1/2 . . . 4. *S. grossulariifolia*
- 4b. Calyx pubescence more dense than that of the herbage, mainly 6.8–9 mm long at anthesis; leaf blades rather uniformly dissected to the base, mostly longer than broad, the terminal lobe mostly more than half as broad as long; carpels with lacunae in the lower ca. 1/3 . . . 7. *S. rusbyi*
- 1b. Herbage moderately to densely pubescent, shaded yellow, white, or gray (the stems sometimes suffused with red-purple).
- 5a. Inflorescence loosely thyrsoid (appearing paniculate), leafy; flowers not numerous at each node; peduncles generally elongate; calyx surpassing the fruit; carpels with reticulae extending onto back of carpel; leaves with conspicuous, elevated veins beneath, the pubescence often turning yellow in age; plants of Washington and Kane Cos., Utah, and adjacent Nevada, Arizona, and California; Mexico . . . 1. *S. ambigua*
- 5b. Inflorescence contracted thyrsoid-glomerate, not especially leafy; flowers often numerous at each node; peduncles generally contracted; calyx often shorter than the fruit; carpels with reticulae confined to lateral face of carpel; leaves conspicuously veined or not, the pubescence seldom if ever turning yellow in age; plants of various or other distribution.
- 6a. Leaves shallowly 3- to 5-lobed; carpels with well-defined to nearly obscure reticulae on the lower 1/3 of the carpel; plants mainly of western Colorado, west across Utah to Nevada and eastern California, and south to northwestern New Mexico and central Arizona . . . 6. *S. parvifolia*
- 6b. Leaves 3- to 5-cleft, -parted, or -divided, carpels with well-defined reticulae on less than half of carpel face; plants of various distribution.
- 7a. Plants copiously stellate-pubescent, the trichome branches not radiating in a single plane, appearing gray, known only from Smoky Mountain in eastern Kane Co., Utah . . . 2. *S. fumariensis*
- 7b. Plants not copiously pubescent or appearing especially gray, the trichome branches mostly radiating in a single plane, of other distribution.
- 8a. Herbage bright green; leaves thin-textured, often narrowly lobed; plants of Glen Canyon of the Colorado River and its tributaries, in eastern Kane and Garfield, and western San Juan Cos., Utah . . . 5. *S. moorei*

- 8b. Herbage gray-green to whitish canescent; leaves often thick-textured, seldom narrowly lobed; plants widespread in the western United States . . . 4. *S. grossulariifolia*

1. **Sphaeralcea ambigua** A. Gray, Proc. Amer. Acad. 22: 292. 1887.

Stems arising from a woody caudex, several to numerous, 3–10 dm tall, shaded white to yellow canescent, the trichomes becoming yellow in age; leaf blades 1–6 cm long (from sinus to apex), 0.8–5 cm wide, thickened, usually rugose, with veins prominent beneath, ovate, deltate, or nearly orbicular, the base cordate to deeply cordate, obscurely to definitely 3- to 5-lobed, the lobes crenate; inflorescence commonly open glomerate-paniculate, but sometimes narrowly thyrsoid; pedicels usually shorter than calyx; calyx 6–12(–20) mm long at anthesis, usually uniformly and densely stellate-pubescent but sometimes glabrescent on the outer surface, the lobes lanceolate to acuminate; petals 15–22(–35) mm long, orange (grenadine) to orange-pink (fading pink); carpels 3.5–6 mm high, 2–4 mm wide, the reticulate portion comprising ca. 1/3 of the carpel; n = 5.

Habitat and distribution. Creosote bush, Joshua tree, ambrosia, blackbrush, mixed warm desert shrub, and pinyon-juniper communities at 700 to 1750 m in western Kane and Washington Counties, Utah; Nevada, Arizona, and California; Mexico.

Our materials belong to *Sphaeralcea ambigua* var. *ambigua*. The common name slippery elm has been applied due to the mucilaginous condition that allows the bark to peel easily from the stem. The plants are components of forage for both livestock and desert tortoise.

2. **Sphaeralcea fumariensis** (S. L. Welsh & N. D. Atwood) N. D. Atwood & S. L. Welsh, stat. nov. Basionym: *Sphaeralcea grossulariifolia* (Hooker & Arnott) Rydberg var. *fumariensis* S. L. Welsh & N. D. Atwood, Rhodora: 103: 83. 2001. TYPE: U.S.A. Utah: Kane Co., W side of Little Valley, N of Lake Powell, 6 May 1998, S. L. Welsh & N. D. Atwood 26968 (holotype, BRY).

Stems few to many from a woody caudex, 2.3–5.5 dm tall or more, the stems typically dark red-purple at least near the base, the herbage gray-green and abundantly stellate pubescent, the trichomes with longest ray 0.8–1.2 mm long, the rays radiating in more than one plane; leaf blades

1.2–3.7 cm long, 2–7.8 cm wide, often wider than long, cordate-ovate or cordate in outline, the base cordate to truncate or obtuse, digitately 3- to 5-lobed, the main lobe 1–3.5 cm long and 0.8–2.5 cm wide, entire or cleft or parted to irregularly toothed; inflorescence rather compactly thyrsoïd, with usually more than 1 flower per node, or rather compactly glomerate-paniculate with 2 to 5 flowers on lateral peduncles; pedicels shorter than to longer than the calyx; bracteoles linear, sometimes red-purple, but not especially contrasting with the calyx; calyx 7.5–9.5(–12) mm long at anthesis, green, becoming stramineous in fruit, uniformly and densely stellate-hairy, the rays of hairs radiating in more than a single plane, the lobes ovate to lance-acuminate; petals 12–17 mm long, orange (grenadine); carpels 10–14, 3.3–4.1 mm high, 2.1–2.8 mm wide, the reticulate portion forming ca. 1/2 of the carpel, the lacunae \pm opaque.

Habitat and distribution. Matchweed, ephedra, blackbrush, galleta, shadscale, and juniper communities, at 1340 to 1650 m, endemic on the Straight Cliffs, Tropic Shale, and Dakota Formations, and on alluvium derived from those formations, on Smoky Mountain and vicinity, eastern Kane County, Utah.

The copiously stellate-hirsute pubescence gives the plants of *Sphaeralcea fumariensis* a gray-green appearance when dry, and a truly gray appearance in the field. Many of the trichomes are caducous, with abundant residue of stellate trichomes accumulating in the pressing paper. It is possibly most closely allied to *S. moorei*, which occurs nearby in sandy soils along Glen Canyon in Kane County and east through Garfield and San Juan Counties, but differs from that entity not only in the harsh pubescence but in the larger calyces. These features, along with the restricted habitat, markedly separate it from the green, thin-leaved, and narrowly lobed plants of *S. moorei*.

Representative specimens examined. U.S.A. **Utah:** Kane Co., head of Smoky Hollow dugway, T41S, R4E, S8, 17 June 1998, *N. D. Atwood & S. L. Welsh* 23859 (BRY); Tibbett Spring, T41S, R3E, S32, 20 May 1999, *N. D. Atwood et al.* 24598 (BRY); ca. 7 mi. W of Smoky Mountain, head of Creeks road, T40S, R3E, S36, 20 May 1999, *N. D. Atwood et al.* 24614 (BRY); ca. 7 mi. W of Kelly Grade, Croton Canyon Junction, T43S, R3E, S14, 20 May 1999, *N. D. Atwood et al.* 24627 (BRY); Drip Tank Canyon, E of Four Mile Bench, T40S, R3E, S24, 6 May 1998, *S. L. Welsh & N. D. Atwood* 26938 (BRY); Reeses Canyon, ca. 2 mi. N of confluence of Last Chance Canyon/Reeses Canyon, T40S, R4E, S36, 21 May 1999, *N. D. Atwood et al.* 24638 (BRY).

3. *Sphaeralcea gierischii* N. D. Atwood & S. L. Welsh, sp. nov. TYPE: U.S.A. Arizona: Mohave Co., ca. 0.2 mi. N of Black Rock Gulch, T40N, R13W, S3, 24 Apr. 2000, *N. D. Atwood, B. Furniss & L. C. Higgins* 25293 (holotype, BRY; isotypes, ARIZ, ASU, BRY, GH, MO, NY, RM, US). Figure 1.

Similis *S. moorei* in habitu sed in floribus majoribus pubescentiis paucioribus vel nullis in laminis et calyces externis et carpelis majoribus discrepantibus, et e *S. rusbyi* in floribus (petalisque et calycibus) majoribus calycis glabris externis divergentibus.

Stems few to many from a woody caudex, 4.3–10.3 dm tall, the stems often dark red-purple, the herbage bright green and subglabrous to almost or quite glabrous; leaf blades 1.2–4 cm long, 1–5 cm wide, usually longer than wide, ovate to cordate-ovate in outline, the base cordate to truncate or obtuse, 3- to 5-lobed, the main division entire or cleft or parted to irregularly toothed; inflorescence thyrsoïd, with usually more than 1 flower per node, or glomerate-paniculate with 2 to 5 flowers on axillary peduncles; pedicels shorter than to much longer than the calyx (to 7 cm long); bracteoles linear, often red-purple and contrasting with the calyx; calyx 5–10 mm long, green, becoming stramineous in fruit, uniformly glabrous externally (or rarely with one or few stellate hairs), the rays of hairs mainly radiating in a single plane, the lobes ovate to lance-acuminate; petals 15–25 mm long, orange (grenadine); carpels 10–15, 4.5–5.5 mm high, the reticulate portion forming from 2/5 to 3/5 of the lower portion of the carpel, reticulate on the sides.

Habitat and distribution. Warm desert shrub community, mainly on gypsiferous outcrops of the Harrisburg Member of the Kaibab Formation, at ca. 1090 m, in northern Mohave County, Arizona (near Black Rock), and in closely adjacent Washington County, Utah.

Pubescence is a variable feature throughout the genus, but seldom is it so lacking as in *Sphaeralcea gierischii*, wherein only the inner portion of the calyx and the carpels are routinely copiously stellate. The stems are produced in tall, open clumps, and are only sparingly leafy. Main foliage leaves in the lower portion of the stems are large, with the central lobe greatly elongated and having a long-cuneate base. Pubescence on the herbage is very sparse, and on the calyces consists of one or a few trichomes when any hairs are present at all. The open inflorescence is shared with *S. rusbyi*, and in both cases the feature might be derived in some part or entirely from the contiguous *S. ambigua* A. Gray, which frequently has large flowers (15–22 mm

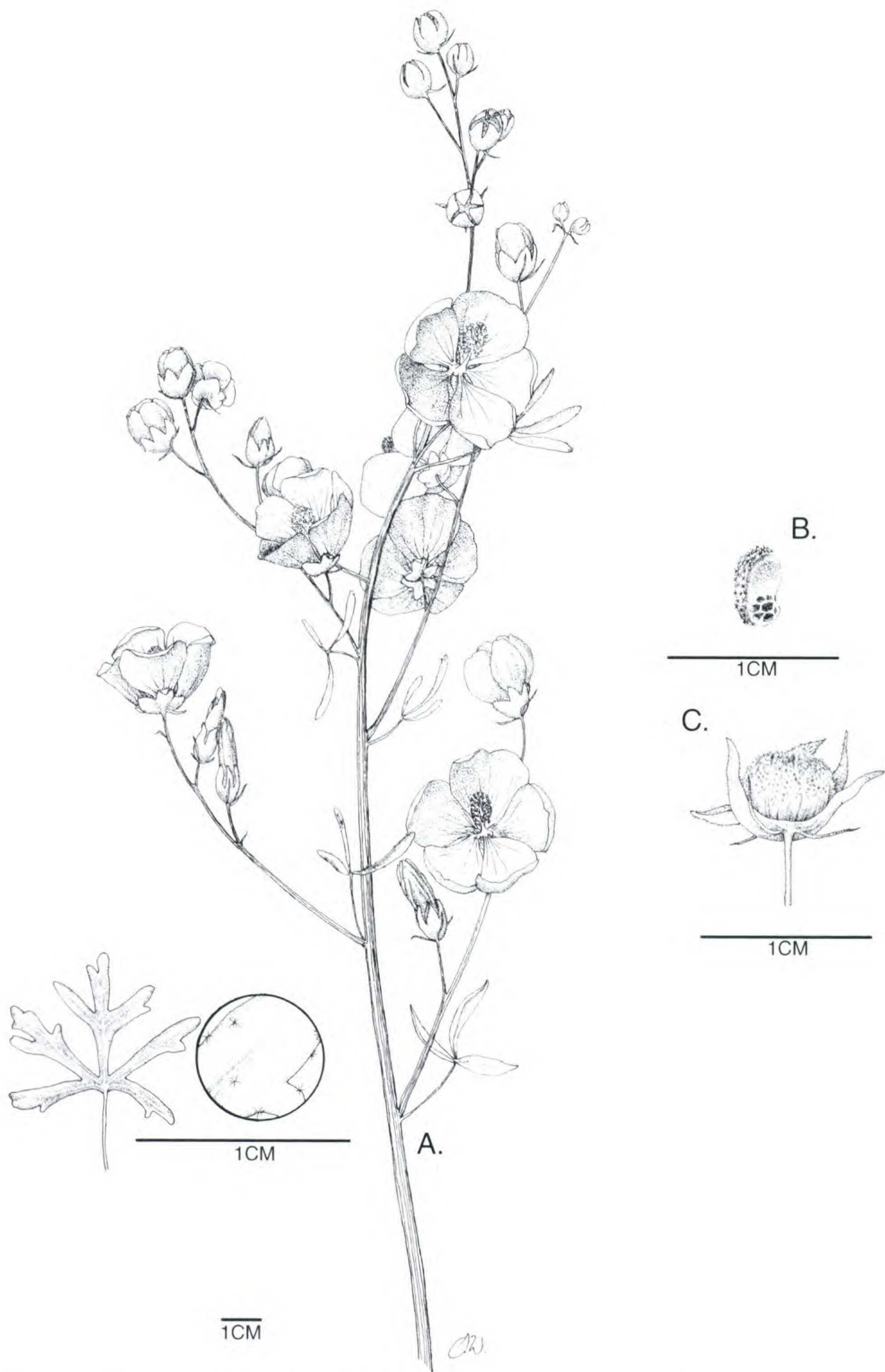


Figure 1. *Sphaeralcea gierischii* N. D. Atwood & S. L. Welsh. —A. Habit. —B. Carpel (longitudinal view). —C. Calyx and schizocarp. Drawn from the holotype collection, N. D. Atwood, B. Furniss & L. C. Higgins 25293 (BRY).

long), but differs vastly in its dense white to yellow canescent, thick, usually rugose, prominent veined, deltoid to nearly orbicular cordate-based leaves, short pedicels, and larger prominent reticulate carpels (12–16 mm high).

Paratypes. U.S.A. **Arizona:** Mohave Co., Black Knolls, T41N, R12W, S7, 26 May 1978, *R. K. Gierisch* 4355 (BRY); Black Knolls, T41N, R12W, S7, 23 Apr. 2000, *N. D. Atwood & B. Furniss* 25233 (BRY); Black Knolls, T40N, R13W, S3, 10 May 2000, *N. D. Atwood* 25543 (BRY); 1.2 mi. N of Black Rock Gulch, 24 Apr. 2000, *N. D. Atwood* 25287 (BRY); S of Black Knolls, 6 June 1980, *C. E. Bundy* 119 (BRY). **Utah:** Washington Co., T43S, R16W, S28, 3/4 mi. S of Little Round Valley, ca. 2 mi. S of Atkinville, 29 Apr. 1985, *K. Thorne & N. D. Atwood* 3749 (BRY).

The species is named in memory of the late Ralph K. Gierisch, ardent collector of plants in the Intermountain West for more than five decades, who spent several years in the latter part of the century (1970s and early 1980s) investigating the flora of the Mohave Strip, Mohave County, Arizona. He made the first collection of the species from the Black Knolls in 1978.

4. *Sphaeralcea grossulariifolia* (Hooker & Arnott) Rydberg, Bull. Torrey Bot. Club 40: 58. 1913. *Sida grossulariifolia* Hooker & Arnott, Bot. Beechey Voy. 326. 1840. *Malvastrum grossulariifolium* (Hooker & Arnott) A. Gray, Mem. Amer. Acad. II. 4: 21. 1849. *Sphaeralcea pedata* Torrey, in A. Gray, Mem. Amer. Acad. II. 4: 23. 1849. *Sphaeralcea grossulariifolia* subsp. *pedata* (Torrey) Kearney, Univ. Calif. Publ. Bot. 19: 88. 1935; protologue locality: "California. Frémont." TYPE: "Frémont's Expedition to California 411, 1845. *Sphaeralcea* new (*S. Pedata* call it). Moving Fork, 1st Camp. Utah" (holotype, NY-Torrey). [Moving Fork is probably in western Colorado (Welsh, 1998: 368).]

Stems few to many from a woody caudex, mostly 3.5–7.5 dm tall or more, the herbage shaded white or gray to yellow canescent to rather sparsely stellate-hairy and green; leaf blades 1.2–5 cm long, 1.3–5.2 cm wide, from longer than wide to wider than long, cuneate-ovate to ovate or cordate-ovate in outline, the base cordate to truncate or obtuse, 3- to 5-lobed, the lobes distinct to the base or confluent to well above the base, the main lobe again few-lobed or less commonly parted or irregularly toothed; inflorescence compact-thyrseoid, with usually more than 1 flower per node; pedicels shorter than to longer than the calyx; calyx 4.5–9 mm long, uniformly stellate or rarely the calyx lobes glabrate, the rays of hairs not or less commonly radiating in a single plane, the longest rays mainly less than 0.5 mm long

except on some calyx bases, the calyx lobes ovate to lance-acuminate; petals 8–18 mm long, orange or rarely rose pink; carpels 10–14, 2.9–3.7 mm high, reticulate portion forming from 2/5 to 3/5 of the carpel, the lacunae opaque or nearly so.

Habitat and distribution. Salt, warm, and cool desert shrub, pinyon-juniper, and ponderosa pine communities at ca. 790 to 2290 m in Beaver, Box Elder, Carbon, Emery, Garfield, Grand, Juab, Iron, Kane, Millard, Piute, Salt Lake, San Juan, Sanpete, Tooele, Uintah, Utah, Washington, and Wayne Counties, Utah; Washington, Oregon, California, Nevada, and Arizona.

This is the most common and widely distributed species in Utah except for the only distantly related *Sphaeralcea coccinea* (Nuttall) Rydberg, which is widespread, occurring from Texas to the Western U.S., north to Canada. However, *Sphaeralcea grossulariifolia* forms intermediates with *S. coccinea*, *S. parvifolia*, and with the more northerly distributed *S. munroana* (Douglas) Spach ex A. Gray, which occurs in northern Utah northward. The report by Kearney (1935) of *S. digitata* (Greene) Rydberg apparently belongs here with *Sphaeralcea grossulariifolia*. Leaf variation is great, but the blade dissection is less complex than in the similar and undoubtedly closely allied *S. moorei*, *S. fumariensis*, *S. rusbyi*, and *S. gierischii*. The Colorado Canyons and Kaiparowits endemics, *S. moorei* and *S. fumariensis*, share with *S. grossulariifolia* the feature of the reticulate portion of the carpel covering 2/5 to 3/5 of the surface.

There is much variation within the widely distributed *S. grossulariifolia*, with herbage varying in aspect from gray to gray-green or brownish, to yellow-green, to green. Leaf blades tend not to be cut completely to the base as is often the case in the related *S. moorei*, *S. fumariensis*, *S. rusbyi*, and *S. gierischii*. Most specimens range in size from 3.5 to 5.5 dm in height, while all of the other species, except *S. fumariensis*, commonly tend to exceed that height. It seems probable that most Utah specimens from Washington County, previously identified as *S. grossulariifolia*, are better placed with the taller *S. rusbyi*, which tends to have green or greener herbage, more uniform and more uniformly deeply cut leaf blades, and proportionally less of the carpel base occupied by reticulae.

5. *Sphaeralcea moorei* (S. L. Welsh) N. D. Atwood & S. L. Welsh, stat. nov. Basionym: *Sphaeralcea grossulariifolia* var. *moorei* S. L. Welsh, Great Basin Naturalist 40: 35. 1980. TYPE: U.S.A. Utah: Kane Co., E side of Last Chance Bay, Lake Powell, Entrada sandstone, 2 May 1972, *S. L. Welsh & N. D. Atwood* 11597 (holotype, BRY). Figure 2.

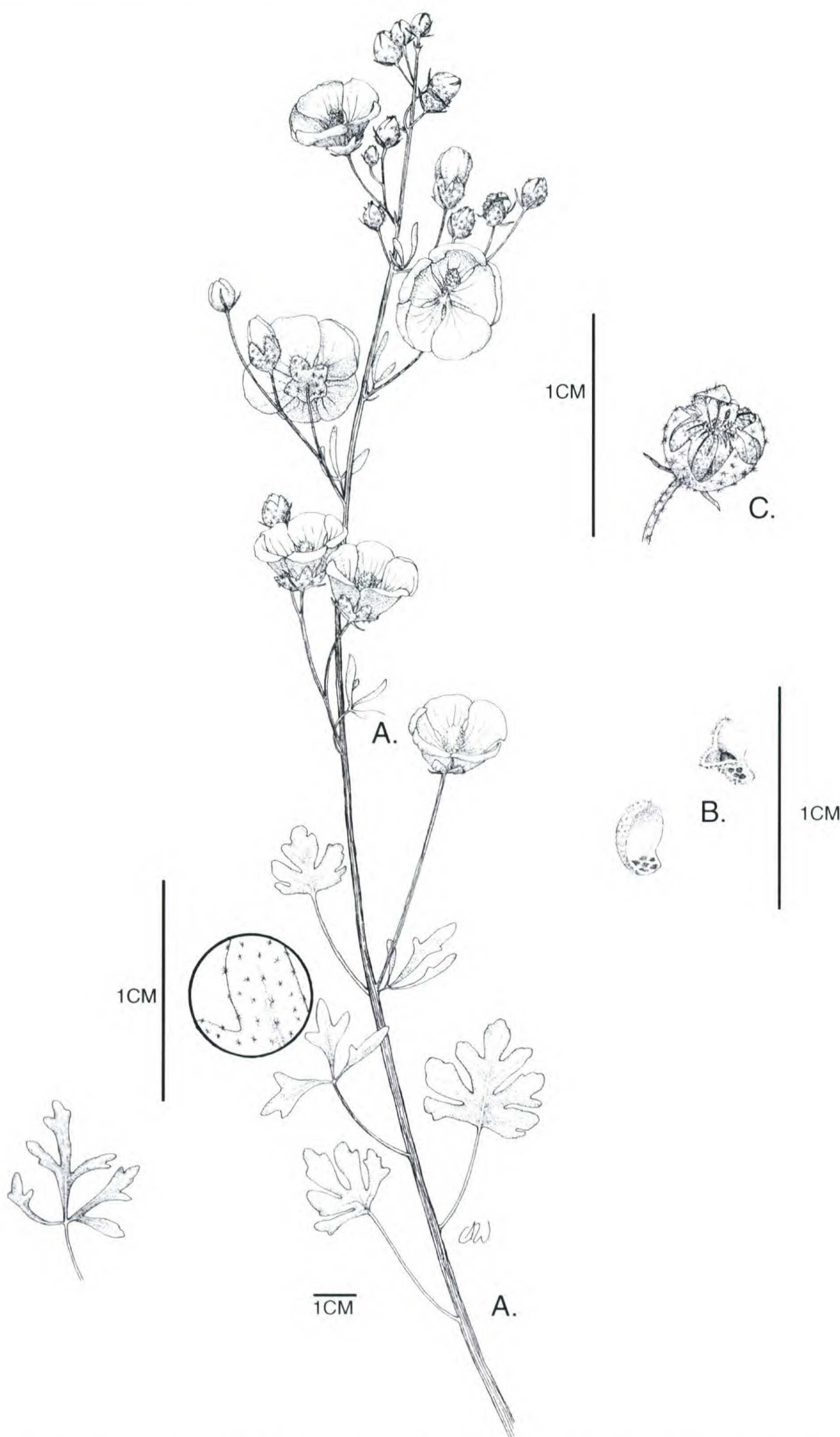


Figure 2. *Sphaeralcea moorei* (S. L. Welsh) N. D. Atwood & S. L. Welsh. —A. Habit. —B. Carpel, closed carpel (left) and open carpel (right). —C. Calyx and schizocarp. Drawn from the holotype collection, S. L. Welsh & N. D. Atwood 11597 (BRY).

Stems few to many from a woody caudex, 3–7.5 dm tall or more, the stems typically dark red-purple at least near the base, the herbage green and rather sparsely stellate pubescent, the trichomes 0.3–0.8 mm wide, the rays radiating in a horizontal plane; leaf blades 0.9–3.5(–7.4) cm long, 1.0–2.6 (15, a rare exception) cm wide, often longer than wide, ovate to cordate-ovate or cordate in outline, the base cordate to truncate or obtuse, digitately 3- to 5-lobed, the main lobe 0.8–3.5(–7.4) cm long and 0.8–1.5 cm wide, entire or cleft or parted to irregularly toothed, or rarely the blade confluent and merely palmately lobed; inflorescence rather compactly thyrsoïd, with usually more than 1 flower per node, or rather compactly glomerate-paniculate with 2 to 5 flowers on axillary peduncles; pedicels shorter than to much longer than the calyx; bracteoles linear, sometimes red-purple, but not especially contrasting with the calyx; calyx 4.5–7.2(–8.5) mm long at anthesis, green, becoming stramineous in fruit, uniformly stellate-hairy or less commonly glabrous externally only near the apex, the rays of hairs mainly radiating in a single plane, the lobes ovate to lance-acuminate; petals 11–15 mm long, orange (grenadine); carpels 10–14, 4.5–5.1 mm high, 2.1–2.3 mm wide, the reticulate portion forming ca. 1/2 of the carpel, the lacunae opaque.

Habitat and distribution. Blackbrush, ephedra, matchweed, Vanclevea, yucca, pinyon-juniper, and sagebrush communities, on alluvium and colluvium, and on the Navajo, Moenkopi, and Cutler, and undoubtedly other, Formations, at 850 to 1830 m, along the Colorado River in Glen Canyon and its tributaries in eastern Garfield and Kane Counties, and in southern San Juan County, Utah, along the San Juan River; endemic.

This is mainly a low-elevation species of sandy tracts along the Lake Powell portion of the Colorado and San Juan Rivers on the Entrada Sandstone Formation. *Sphaeralcea moorei* does extend upward somewhat along the east escarpment of Fifty Mile Mountain, west of Glen Canyon, and evidently reaches its northern limit at Calf Creek, east of Escalante. Some plants with uncut leaves are included here also, especially some from the Three Garden Reentry along Lake Powell. The species tends to intergrade at least morphologically with *S. grossulariifolia*, but not more so than for taxa as a whole in this genus, and it is reasonable to accept it at specific rank.

Representative specimens examined. U.S.A. **Utah:** Kane Co., mouth of Escalante River, Lake Powell, 5 June 1972, *S. L. Welsh & G. Moore 11810* (BRY); Willow Tank, 4 May 1962, *D. A. White 111* (BRY); Escalante Canyon,

5 June 1972, *S. L. Welsh & G. Moore 11827* (BRY); Escalante Canyon, 24 Aug. 1971, *N. D. Atwood & R. Allen 3211* (BRY); Hole-in-the-Rock, 14 May 1953, *B. F. Harrison 12112* (BRY); San Juan Co., 1 mi. E of Hole-in-the-Rock, 16 June 1972, *S. L. Welsh & C. A. Toft 11869* (BRY); Three Garden, Lake Powell, ca. 1 mi. N of confluence with San Juan River Arm, 5 May 1974, *S. L. Welsh 12420* (BRY); Comb Wash, 6 June 1970, *S. L. Welsh & N. D. Atwood 9972* (BRY).

6. *Sphaeralcea parvifolia* A. Nelson, Proc. Biol. Soc. Wash. 17: 94–95. 1904. TYPE: U.S.A. Nevada: Lincoln Co., Caliente, 22 May 1902, *Goodding 916* (RM not seen).

Sphaeralcea marginata York ex Rydberg, Bull. Torrey Bot. Club 33: 145–146. 1906. TYPE: U.S.A. Colorado: Grand Junction, 1901, *C. F. Baker 93* (NY not seen). *Sphaeralcea arizonica* Heller ex Rydberg, Bull. Torrey Bot. Club 40: 59. 1913. TYPE: U.S.A. Arizona: Flagstaff (Coconino Co.), 16 June 1898, *McDougal 120* (holotype, NY not seen).

Stems few to many from branching woody caudex; leaf blades 1.5–5.5 cm long, 1.2–5.2 cm wide, ovate to orbicular, reniform, or cordate-ovate, the base cordate to truncate or obtuse, usually shallowly 3- to 5-lobed, the sinuses usually shallow, the lobes crenate-dentate; inflorescence commonly narrowly thyrsoïd, typically with more than 1 flower per node; pedicels usually shorter than the calyx; calyx uniformly stellate, the rays of hairs not in a single plane, the lobes lance-ovate to deltoid; petals 7–15 mm long, orange; carpels 10–12, 3–4 mm high, the indehiscent part forming from 1/4 to 1/3 of the carpel, faintly reticulate on the sides.

Habitat and distribution. Blackbrush, other warm desert shrub, salt desert shrub, sagebrush, pinyon-juniper, and mountain brush communities at 820 to 2700 m in Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, San Juan, Sevier, Tooele, Uintah, Washington, and Wayne Counties, Utah; Western Colorado, Nevada, Arizona, New Mexico, and California.

Sphaeralcea parvifolia has been compared by Kearney (1935) with *S. ambigua*, which it resembles in habit and leaf morphology. It is, however, the more southern and lower elevation counterpart of *S. munroana*, from which *S. parvifolia* cannot always be distinguished, and with which it could be included without serious damage to the taxonomy of the genus. Otherwise, the relationships of *S. parvifolia* in Utah seem to lie with the largely sympatric *S. grossulariifolia*, but it is apparently transitional with both *S. ambigua* and *S. rusbyi*. The confluent leaf blades of *S. parvifolia* are diagnostic for most specimens from those of *S. grossulariifolia*, and the smaller leaf blades and less apparent ve-

nation allow segregation of most specimens from *S. ambigua*, but in neither instance should blade size and confluence be taken as tools for positive identification. As in most taxa within the genus the morphological features blend where the taxa are in geographical contact, and indeed many of the diagnostic features are vegetative ones. However, the characteristics of the fruiting carpels are not absolute as diagnostic tools either.

7. *Sphaeralcea rusbyi* A. Gray, Proc. Amer. Acad. 22: 293. 1887. TYPE: U.S.A. Arizona: Yavapai Co., Prescott, May 1883, *H. H. Rusby* 537 (holotype, NY).

Stems few to many from a woody caudex, 2.4–8.2 dm tall or more, the stems typically dark red-purple at least near the base, the herbage green and rather sparsely stellate-pubescent to rather densely so, the trichomes 0.4–0.8 mm wide, the rays radiating in more than a single plane; leaf blades 1.6–4.3 cm long, 0.6–3.5 cm wide, usually longer than wide, ovate to cordate-ovate in outline, the base cordate to truncate or obtuse, digitately 3- to 5-lobed, the main 1.3–3.8 cm long and 5–2.6 cm wide, entire or cleft or parted to irregularly toothed, or rarely the blade confluent and merely digitately lobed; inflorescence rather compactly thyrsoïd, with usually more than 1 flower per node, or compactly glomerate-paniculate with 2 to 5 flowers on axillary peduncles; pedicels shorter than to much longer than the calyx; bracteoles linear, sometimes red-purple, but not especially contrasting with the calyx; calyx 6.5–9.5 mm long at anthesis, green, becoming stramineous in fruit, uniformly stellate-hairy or glabrous externally only near the apex, the rays of hairs mainly radiating in more than a single plane, the lobes ovate to lance-acuminate; petals 12–19 mm long, orange (grenadine); carpels 10–14, 4.5–5.2 mm high, 2.4–2.8 mm wide, the reticulate portion forming ca. 1/3 of the carpel, the lacunae opaque.

Habitat and distribution. Mixed desert shrub and floodplain communities, with cottonwood, oak, juniper, creosote bush, rattany, burrobrush, blackbrush, ephedra, snakeweed, rabbitbrush, and four-wing saltbush on Quaternary alluvium and colluvium, Chinle, Moenkopi, and Kaibab and other mostly calcareous formations, at ca. 1030 to 1220 m in Iron and Washington Counties, Utah, and Mohave and other counties, Arizona.

In addition to the features cited in the key, the herbage of *S. rusbyi* is ordinarily green or suffused with dark purple and with rather sparsely stellate

hairs, much less so than the calyx; the inflorescence tends to be open glomerate-paniculate, and the flowers average larger (to 18 mm long) than those of the similar *S. grossulariifolia* (mainly less than 15 mm long). The species is apparently most closely allied to *S. gierischii*, however. Its smaller flowers (both calyces and petals) and rather densely stellate calyces are apparently diagnostic. Until recently *S. rusbyi* has been a very obscure and poorly understood species in Utah (Welsh et al., 1993), with specimens examined not at all uniform and many of them included with the previous concept of *S. grossulariifolia*. The main foliage leaves of *S. rusbyi* are rather uniformly ovate-oval in outline, and are rather uniformly pedately lobed. Stems of *S. gierischii* tend to be sparsely leafy, with the blades more broadly ovate in outline, and with the lobes much attenuated at the base. In this manner, *S. gierischii* differs from all other closely allied taxa in southern Utah and northern Arizona, including *S. moorei*, which it somewhat resembles in the narrowly lobed leaves and stem color. The larger set available now allows a better understanding of the taxon within Utah, where it is confined to Washington County, with the exception of one population overlapping the very southeast corner of Iron County.

Representative specimens examined. U.S.A. **Arizona:** Mohave Co., 38 mi. SE of Littlefield, T33N, R15W, 25 Apr. 1997, *N. D. Atwood & S. L. Welsh* 21804 (BRY). **Utah:** Iron Co., Camp Creek 1 mi. ESE of I-55, T38S, R12W, S10, 23 Sep. 1987, *K. H. Thorne et al.* 5691 (BRY); Washington Co., ca. 1 mi. NE of La Verkin, 30 Apr. 1993, *S. L. Welsh & L. C. Higgins* (BRY); 6 mi. E of Hurricane, 27 May 1968, *N. D. Atwood* 1405 (BRY); Kolob Terrace, T39V, R11W, S23, 7 July 1981, *S. L. Welsh* 20718 (BRY).

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